

**REMARKS**

In the Office Action, claims 1, 2, 4, 5-8, 13-14 and 21-27 were rejected. Claims 3, 9-12 and 15-20 were earlier withdrawn. By the present Response, independent claims 1, 13, 21, and 26 are amended. These amendments do not add any new matter. Upon entry of the amendments, claims 1-27 will be pending in the present patent application, with claims 1, 2, 4, 5-8, 13-14 and 21-27 presently being examined. Reconsideration and allowance of all pending claims are requested.

**Rejections Under 35 U.S.C. §102**

Claims 1, 21 and 24-27 were rejected under 35 U.S.C. § 102(b) as being anticipated by Chiang. Claims 1, 2 and 8 were also rejected under 35 U.S.C. § 102(e) as being anticipated by Leavitt. Claims 1, 2, 8, 21 and 24-27 are believed to be patentable as discussed below.

Applicants respectfully assert that the present invention, as recited in independent claims 1, 13 and 26, is patentable over Chiang.

***Independent claims 1, 21, 26 and their dependents***

Independent claim 1, as amended, recites, *inter alia*, a probe that includes a plurality of reconfigurable pulsers responsive to one or more transmit timing signals received from an external system to transmit pulses to a plurality of transducers.

Claim 21, recites, *inter alia*, a method for operating a transducer probe that, similarly, includes controlling a plurality of reconfigurable pulsers in a probe utilizing the one or more signals from an external system.

Similarly, claim 26 recites *inter alia*, a method for operating a transducer probe. The method includes controlling a plurality of reconfigurable pulsers in the probe utilizing the one or more signals generated in the transducer probe.

**Chiang fails to teach *plurality of reconfigurable pulsers within said probe responsive to one or more transmit timing signals received from an external system to transmit pulses to said plurality of transducers.***

In the "Claim Rejections" section, on page 4 of the current Office Action, the Examiner suggested that Chiang is believed to teach plurality of pulsers within a probe responsive to one or more transmit timing signals received from an external system to transmit pulses to said plurality of transducers, and referred to FIG. 3 and 4 and col. 9, lines 17-30 of Chiang. The cited passage reads:

This provides greater flexibility and better fidelity to the actual medical data since it permits the array traversals to be designed so that they do not impose an unnatural image reconstruction scheme. The approach taken in the present invention provides greater flexibility in that multiple effective paths through the (x,y) array are possible. As a result, full advantage is taken of different ultrasound scan frequencies and, hence, imaging depth.

After the image data is scan converted, it is post processed in accordance with its eventual intended presentation format. For example, the data can be digitized and formatted for presentation on a display. Alternatively, the (x,y) data values can be presented to a video compression subsystem which compresses the data to allow for data transmission to remote sites by modem or other known communication means.  
(Emphasis added.)

The cited passage from Chiang does not support the Examiner's position, however. In describing the scan head for an ultrasound imaging system, nowhere does Chiang teach *a plurality of reconfigurable pulsers within said probe responsive to one or more transmit timing signals received from an external system to transmit pulses to said plurality of transducers*. Indeed, one skilled in the art would clearly understand that the pulsers are *simply grouped in arrays*. Chiang, at the very least, never indicates that *any pulser can be reconfigurable*. Applicants' claimed invention, on the other hand, includes pulsers that can be reconfigured to provide a many-to-many mapping from the low voltage timing signal to

pulsers 12, and from pulsers 12 to transducers 38, respectively. Lines 8-19 of paragraph 22 of the application elaborate this further:

Multiplexers 40 and 42 are reprogrammed before each transmit operation to provide a many-to-many mapping from the low voltage timing signal to pulsers 12, and from pulsers 12 to transducers 38, respectively. Not all configurations include both multiplexers 40 and 42, and some configurations omit both multiplexers 40 and 42. Some configurations omitting either or both multiplexers compensate for the omission by including a larger number of pulsers 12 to control the same number of transducer elements 38. In configurations in which one or more multiplexers 40 and/or 42 are included, a local controller (not shown) responsive to control signals from imaging system 20 provides control signals and configures the multiplexers. Control can be provided algorithmically, or it can be stored in a memory (not shown) within probe handle 14. In some configurations, imaging system 20 is configured to load this memory.

On the contrary, the method taught by Chiang relates to a portable ultrasound imaging system that includes a handheld scan head coupled by a cable to a portable battery-powered data processor and display unit, preferably in the form of a lap-top computer. The reference neither teaches nor suggests that a plurality of reconfigurable pulsers are or could be provided in the probe. As such, Chiang cannot anticipate the independent claims, as amended, or their respective dependent claims.

**Leavitt similarly fails to teach a probe with a plurality of reconfigurable pulsers.**

In the "Claim Rejections" section, on page 5 of the current Office Action, the Examiner suggested that Leavitt is believed to teach plurality of pulsers within a probe responsive to one or more transmit timing signals received from an external system to transmit pulses to a plurality of transducers, and referred to col. 3, lines 53-55 and col. 4, lines 21-23 and lines 43-46 of Leavitt. The cited passages read:

However, the phased array beamformer 202 could be partitioned as a sub-beamformer with the sub-beamformers contained within the probe assembly 106 (FIG. 1).

Leavitt, col. 3, lines 53-55.

Importantly, the arrangement of the n-element sector phased array 200 assures that each ultrasonic transducer element 204-1 through 204-n is associated with its own corresponding delay channel.

Leavitt, col. 4, lines 21-23.

the front-end processor 308 may be implemented as one or more ASICs. The T/R switch 304 also functions as an isolation circuit, thus preventing transmit energy supplied by high voltage transmit pulser 336 via connection 338.

Leavitt, col. 4, lines 43-46.

The cited passages from Leavitt, here again, do not support the Examiner's position. In describing the portable, configurable and scalable ultrasonic imaging system, nowhere does Leavitt teach *a plurality of reconfigurable pulsers within a probe responsive to one or more transmit timing signals received from an external system to transmit pulses to a plurality of transducers*. Indeed, one skilled in the art would clearly understand that the pulsers, like those of Chiang discussed above, are *simply grouped in arrays*. Leavitt, like Chiang, never indicates that *any pulser can be reconfigurable*.

In summary, Applicants respectfully submit that Leavitt cannot anticipate the pending independent claims or their respective dependent claims. Accordingly, Applicants respectfully request the Examiner to reconsider the rejection of these claims.

### **Rejections Under 35 U.S.C. § 103**

The Office Action summarizes claims 4, 5, 13 and 14 as rejected under 35 U.S.C. § 103(a) as being unpatentable over Leavitt. Claims 6 and 7 were rejected

under 35 U.S.C. § 103(a) as being unpatentable over Chiang in view of Little.  
Claims 22 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chiang.

Independent claim 13, recites, *inter alia*, a probe that comprises an array of reconfigurable pulsers, with transducers responsive to pulses from a dedicated reconfigurable pulsers.

**Leavitt fails to teach an array of reconfigurable pulsers, with transducers responsive to pulses from a dedicated a reconfigurable pulsers.**

In the "Claim Rejections" section, on page 6 of the Office Action, the Examiner suggested that Leavitt is believed to teach an array of reconfigurable pulsers, and transducer responsive to pulses from dedicated reconfigurable pulsers, and referred to col. 4, lines 22-23 of Leavitt (quoted above).

As noted above, Leavitt fails to teach, or even suggest a plurality of reconfigurable pulsers in a probe, or transducers responsive to such pulsers. Accordingly, Leavitt cannot support a *prima facie* case of obviousness of claim 13 or its dependent claims.

**Conclusion**

In summary, neither Chiang nor Leavitt nor Little teach, suggest or disclose an array of reconfigurable pulsers, with transducers responsive to pulses from dedicated reconfigurable pulsers as recited in independent claims 1, 13, 21 and 26. Thus, it is respectfully requested that the rejections under 35 U.S.C. §§ 102 and 103(a) be withdrawn.

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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PS  
Patrick S. Yoder  
Reg. No. 37,479  
FLETCHER YODER  
P.O. Box 692289  
Houston, TX 77269-2289  
(281) 970-4545